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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/743,962 | 01/18/2001 | Isamu Kurisawa | Q62718 | 1432 |

7590 06/16/2004
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EXAMINER

DOVE, TRACY MAE

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| ART UNIT | PAPER NUMBER |
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1745

DATE MAILED: 06/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

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|-----------------|-----------------|--|
| Application-No. | Applicant(s) | |
| 09/743,962 | KURISAWA, ISAMU | |
| Examiner | Art Unit | |
| Tracy Dove | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 14, 15, 20, 24, 25 and 27-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 14, 15, 20, 24, 25 and 27-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-546)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

This Action is in response to the communication filed on 4/8/04. Applicant's arguments have been considered, but are not persuasive. Claims 1-10, 14, 15, 20, 24, 25 and 27-33 are rejected in view of the prior art.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/8/04 has been entered.

Specification

The objection to the specification has been withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6 and 15 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Dasgupta et al., US 5,547,782.

Dasgupta teaches a lithium ion battery wherein corrosion of the current collector in contact with the electrode face is greatly reduced. An electrically conductive, ceramic layer is inserted between the current collector and the corresponding major face of the lithium ion battery. In an alternative embodiment, the metallic current collector plate is replaced by an electrically conductive laminated organic polymer having electrically conductive particles dispersed therein. The lithium ion battery includes a casing wherein the casing usually serves as the positive current collector and the metallic cover plate is usually the negative current collector. See abstract, col. 3, lines 17-23 and Figs 1 & 3-4. The corrosion protection layer (ceramic layer) is placed between the electrode (active material layer 4 in Fig. 1) and the metallic current collector (col. 4, lines 17-19). The ceramic layer may be produced by chemical vapor deposition (CVD), sputtering or flame or plasma spraying (col. 4, lines 55-63). The ceramic substance may be titanium nitride, zirconium nitride or any other ceramic material which is electrically conductive and may be obtained in the form of layers may also be used (col. 4, lines 33-39).

Thus the claims are anticipated.

The claims are alternatively unpatentable because the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. Claim 1 contains the limitation "a pressure of 4×10^4 to 20×10^4 Pa is maintained perpendicularly to the surface of said collector". This is considered a product-by-process limitation, thus, the limitation is obvious. Regardless of the pressure used to prepare the storage battery, the storage battery of the instant

invention and the prior art are the same. Note the claimed pressure range includes standard atmospheric pressure of 1 atm (10×10^4 Pa). Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP §2113.

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Claims 1-7, 10, 14, 20, 24, 25 and 28-33 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Kao, Substrate materials for bipolar lead/acid batteries, Journal of Power Sources, 70 (1998).

Kao teaches a battery with a bipolar configuration is known to be advantageous over the conventional monopolar configuration in terms of power output. In a bipolar configuration, active materials of opposite polarities are placed on the two surfaces of a bipolar substrate. In a bipolar lead acid battery, the role of the substrate is paramount. The substrate serves as an intercell connection, as a support to active materials and provides a seal between individual cells (separator inherent between individual cells). The substrate must be electrically conductive and insoluble in sulfuric acid. Lead sheets are known substrate materials (see Introductions section page 8). Kao teaches different ceramic materials may be applied to a current collector (Table 1). Kao specifically discloses a laminated SnO_2 /carbon plastic substrate (page 13, second to last line). Kao teaches ceramic materials such as TiSi_2 , Ti_5Si_3 , NbSi_2 , TaSi_2 and Ta_5Si_3 (Table 1) are

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known. The SnO_2 is made conductive by dopants such as antimony and fluorine in the lattice structure (page 12).

Thus the claims are anticipated.

The claims are alternatively unpatentable because the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. Claim 1 contains the limitation "a pressure of 4×10^4 to 20×10^4 Pa is maintained perpendicularly to the surface of said collector". This is considered a product-by-process limitation, thus, the limitation is obvious. Regardless of the pressure used to prepare the storage battery, the storage battery of the instant invention and the prior art are the same. Note the claimed pressure range includes standard atmospheric pressure of 1 atm (10×10^4 Pa). Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP §2113.

Furthermore, whether the ceramic is applied by sputtering, CVD, spray coating or any other method of coating the substrate is used, the ceramic/substrate composite, as an end product, is the same.

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Claims 1-5, 14 and 20 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Bullock et al., US 5,045,170.

Bullock teaches a bipolar lead acid battery plate including an inorganic metal oxide additive which enhances the formation of the plate. The metal oxide may be a conductive ceramic (abstract). Figure 3 depicts a lead plate 32 (collector substrate) having ceramic layers 31 and active material layers 34. Layers 31 protect the underlying lead layer 32 from corrosion (col. 10, lines 31-32). A bipolar electrode includes a substrate and layers of positive and negative active material disposed on opposite sides of the substrate. The substrate contains the conductive ceramic as a filler (col. 4, lines 30-35).

Thus the claims are anticipated.

The claims are alternatively unpatentable because the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. Claim 1 contains the limitation "a pressure of 4×10^4 to 20×10^4 Pa is maintained perpendicularly to the surface of said collector". This is considered a product-by-process limitation, thus, the limitation is obvious. Regardless of the pressure used to prepare the storage battery, the storage battery of the instant invention and the prior art are the same. Note the claimed pressure range includes standard atmospheric pressure of 1 atm (10×10^4 Pa). Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP §2113.

Furthermore, whether the ceramic is applied by sputtering, CVD, spray coating or any other method of coating the substrate is used, the ceramic/substrate composite, as an end product, is the same.

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Claims 8, 9 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao, Substrate materials for bipolar lead/acid batteries, Journal of Power Sources, 70 (1998).

See discussion of Kao above.

Kao does not explicitly state the mole percent of the dopant (antimony or fluorine) that is incorporated into the SnO_2 lattice structure.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the courts have ruled where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See MPEP 2144.05. Kao teaches SnO_2 doped with antimony or fluorine is known for use as a ceramic material formed on a current collector substrate. SnO_2 has a high oxygen overpotential but the stoichiometric SnO_2 crystal is not conductive. The conductivity of the SnO_2 comes from structural defects caused by low-valent Sn metal or dopants, such as antimony and fluorine in the lattice (page 12 of Kao). Thus one of skill would have been motivated to vary the dopant amount of the SnO_2 in order to achieve a desired balance between the conductivity of the doped SnO_2 ceramic material and the structural defects of the SnO_2 caused by the dopants..

Response to Arguments

Applicant's arguments filed 4/8/04 have been fully considered but they are not persuasive.

Applicant states the pressure element of claim 1 is not a product-by-process limitation. Examiner disagrees with Applicant's analysis of claim 1. The pressure element of claim 1 applies to the collector surface, not to the storage battery (final product). Specifically, the "structure" of claim 1 is the collector not the battery. Furthermore, "maintained" can be interpreted broadly. For example, a pressure applied for 5 seconds is considered "maintained". Thus, the claimed pressure element is a product-by-process limitation because claim 1 does not recite the pressure is present in the battery (final product).

Regarding the process limitation "a pressure of 4×10^4 to 20×10^4 Pa is maintained", the claims do not recite that the collector is kept pressed in the storage battery. Furthermore, the claims do not recite how long the collector is maintained at the recited pressure. Therefore, this limitation could be interpreted as the pressure at which the collector is manufactured before assembling the storage battery. The specification recites "applying an active material to the substrate be subject to a high pressure because it has a poor adhesivity between the collector" and the active material (page 23, second paragraph). The specification further recites the lead batteries of the invention "had been prepared at a pressure of from 40 kPa to 200 kPa" (page 22, last paragraph). This indicates a product-by-process limitation. The specification disclosure of "*had been prepared* at a pressure of from 40 kPa to 200 kPa" does not indicate that the pressure is applied to the final product (storage battery).

Applicant states claim 1 has been amended to more clearly recite a gage pressure. The recited pressure is a product-by-process limitation. Specifically, the claims do not recite the

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pressure added is a pressure of 4×10^4 to 20×10^4 Pa, the claims recite a pressure is added and then the pressure is maintained at 4×10^4 to 20×10^4 Pa. Thus, the pressure that is "added" is clearly a product-by-process limitations because the "added pressure" is not contained in the final product (storage battery). Furthermore, both the claimed invention and the prior art teach a current collector that can be produced at atmospheric pressure (product-by-process limitation).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tracy Dove
Patent Examiner
Art Unit 1745

June 14, 2004